Swift Current Creek Watershed Protection Plan

October 2009

Saskatchewan Watershed Authority

Swift Current Creek Watershed Advisory Committee

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Letter of Transmittal

Dear Watershed Resident:

On behalf of the members of the Swift Current Creek Watershed Advisory Committee and the Swift Current Creek Watershed Stewards, we are pleased to provide you with the Watershed Protection Plan for Swift Current Creek. After nearly two years of involvement in the planning process, the Committee more fully understands the challenges that we face to ensure sustainable water quality and quantity into the future.

We wish to thank members of the Technical Committee who greatly assisted the Watershed Advisory Committee during the final steps in completion of the Watershed Protection Plan.

Our planning process has indirectly represented each and every citizen in our watershed and has fundamentally caused us to reflect on the actions of residents, communities and government; and most importantly, on our own Committee's understanding of watershed management and protection. With this in mind, we formally submit our plan, created and validated through extensive discussions and tempered with consensus-based decisions.

We trust that the intent and content of this document is received in the light it is being presented, with sincerity and with an environmental, economic, and social future in mind. It is our hope that through combined efforts, the significant potential for protecting our source waters in the Swift Current Creek watershed will be realized.

Sincerely,

Harold Martens
Chair, Swift Current Creek Watershed Advisory Committee
Chair, Swift Current Creek Watershed Stewards Inc.

Executive Summary

Despite Saskatchewan having some of the best and most abundant supplies of water in the world, or perhaps because of this fact, there is a growing interest in sound water management and source water protection at the watershed level.

In 2007, the Saskatchewan Watershed Authority approached the Swift Current Creek Watershed Stewards and expressed their interest in partnering on a watershed protection plan. In November 2007, a Watershed Advisory Committee was formed, composed of the Swift Current Creek Watershed Stewards and other interested parties. This document is the culmination of those planning efforts, which involved rural and urban municipal representatives as well as nature-based conservation groups. These representatives shared table space and meeting rooms, tour buses, and project site workshops to discuss the challenges, options, and opportunities around watershed protection.

The recommendations and actions contained in this document have been proposed, discussed, prioritized, and then accepted by planning members and validated by experts from the watershed's Technical Committee.

Watershed planning in the Swift Current Creek watershed is not a panacea for this area. Instead, community-based planning should be viewed as a viable and creative component of sustainable watershed management. The recommendations and key actions contained herein focus on protecting source waters from degradation in quality, or reduction in quantity, within this watershed. The Committee members view the plan as a "living" document. They understand and accept that some recommendations or actions contained in this plan may be adapted or may evolve to address the changing needs and priorities of the communities it represents.

The heart of this document is the Recommendations and Key Actions that were developed by people living in the watershed. Sixty-two initiatives are contained within five broad categories. The categories include Watershed Risks and Stressors; Watershed Stewardship, Education and Communications; Aquifer and Ground Water Protection; Watershed Management; and Water Conservation. The highest priorities of the Committee were related to water supply and management.

1. Introduction to the Swift Current Creek Watershed

The Swift Current Creek watershed is the area of land that drains water into the Swift Current Creek. It begins northeast of Eastend at the foot of the Cypress Hills, and empties into the South Saskatchewan River north of Stewart Valley. The watershed's total drainage area is 5,592 km^2. The watershed includes Rock Creek, Jones Creek, Bone Creek, Duncairn Dam (Reid Lake), and Lac Pelletier. The main channel of the Swift Current Creek is 302 kilometres long, and when Bone Creek and Jones Creek are included it is 446 kilometres long. Major urban municipalities located in the watershed are the City of Swift Current and the Town of Shaunavon.

Photo courtesy of Swift Current Creek Watershed Stewards

The Swift Current Creek is formed by spring runoff and ground water springs. In an area of Saskatchewan which is typically very dry, the water provided from the creek system to landowners and residents is critical for drinking water supply, irrigation, livestock production, and recreation.

Photo courtesy of the Swift Current Museum

Duncairn Dam and the Reid Lake reservoir is a multi-purpose project owned by the Government of Canada and operated by the Agri-Environmental Services Branch of Agriculture and Agri-Food Canada. The earth embankment dam, located 30 kilometres southwest of Swift Current, was completed in 1943 and created a reservoir approximately 19 metres deep at its Full Supply Level with storage of 105,000 cubic decametres (dam^3). The primary purpose of the project is to impound water for 7,000 hectares of irrigation in the area; however, the project also provides a dependable supply of water and some flood protection for the City of Swift Current. The use of the reservoir for recreational activities such as fishing and boating has also increased over the years.

Photo courtesy of Swift Current Creek Watershed Stewards

Lac Pelletier, south of the city of Swift Current, is a spring-fed lake that was established as a regional park in 1964. The park includes amenities such as a nine-hole golf course with grass greens, boating, fishing, and nature/walking trails. During the winter months, ice fishing is very popular, as well as cross-country skiing and snowmobiling. The lake is stocked with perch, walleye, and northern pike.

2. Watershed Planning Methodology

The Swift Current Creek Watershed Stewards Inc. is a primarily volunteer, not-for-profit corporation that was formed in 1998 by local people in the Swift Current Creek and Rush Lake sub-watersheds. Their mission statement is to enhance water quality and stream health in the Swift Current Creek watershed by promoting awareness and understanding among water users. The goals of the Stewards are to:

- educate users of the Swift Current Creek watershed on a continuous basis about issues and impacts which affect water quality;
- monitor water quality and riparian health to assist in co-operative solutions regarding water management issues; and,
- foster an attitude of individual responsibility toward watershed stewardship.

Planning in the Swift Current Creek watershed began in May 2007 with a meeting between the Swift Current Creek Watershed Stewards and a planner from the Saskatchewan Watershed Authority. A recommendation was made to form a Watershed Advisory Committee to represent the municipalities and stakeholders within the watershed, with the majority of participants originating from the Swift Current Creek Watershed Stewards. In April 2008, an additional planner with the Saskatchewan Watershed Authority was assigned to the watershed planning. In addition, the Saskatchewan Watershed Authority partnered with the Swift Current Creek Watershed Stewards for the production of the plan, with the Stewards' Executive Director involved with the strategic and organizational decisions.

Because of the relatively small size of the watershed, a single Watershed Advisory Committee was struck for the area. The watershed planning area incorporated a portion of the Old Wives Lake watershed, also known as the Rush Lake sub-watershed, which receives irrigation waters from the Duncairn Reservoir.

Stakeholder organizations that are directly or indirectly involved or influential in water use or re-use were invited to participate as Watershed Advisory Committee members. Considerable efforts were made to encourage participation from Métis, rural and urban municipalities, and agricultural, conservation and environmental interest groups. Initial meetings were held to provide background on water issues and to initiate the Saskatchewan Watershed Authority's community-based planning model. The Saskatchewan Watershed Authority's mandate and the role of its planners in the planning process were also discussed. Many Watershed Advisory Committee members participated as volunteers, receiving little or no direct remuneration for their planning efforts.

In tandem with the formation of the Watershed Advisory Committee, a Technical Committee comprised of representatives from various agencies specializing in natural resource management began working with the Committee. Technical Committee representatives were drawn from federal and provincial governments with responsibilities in the water portfolio.

They provided expertise on surface and ground water management; water quality monitoring; agricultural and environmental programming and practice; regulation of the energy industry; and in-stream flows. Both committees also took part in a tour of the watershed on June 19, 2008 to help them more fully understand the area. As issues arose during the planning process, the Technical Committee members were called upon to provide technical expertise and/or program support.

Planning activities involved open and frank discussions about new and existing water-related issues. These issues ranged from water management to water conservation and the importance of stewardship. Committee members generally focused on local and regional water-related issues and considered how source waters entering their areas could be better conserved and protected. Discussions on these interests and issues began at Watershed Advisory Committee meetings as members became familiar with each other; at subsequent Committee meetings, their discussions centred on prioritizing their respective objectives and developing recommendations.

To aid in these discussions, the Technical Committee prepared the Swift Current Creek Watershed Background Report, a comprehensive reference document that includes information on the watershed's physical and ecological characteristics, its surface and groundwater resources, a watershed-specific State of the Watershed Report, and current management considerations. Guest presentations on specific topics of interest were commonplace at Committee meetings.

The Watershed Advisory Committee completed their list of interests and issues in November 2008. At the request of the Committee, the planners accelerated the completion of the Watershed Protection Plan. The Workplace Advisory Committee and the Technical Committee met as a single group four times between December 2008 and April 2009 and, using a specially-designed worksheet, developed the Planning Objectives, Recommendations and Key Actions included in section 5 of this document (please see page 13).

Not all of the members that were invited were able to attend all of the meetings, despite efforts to secure comprehensive, broad-scope representation at the planning meetings. These agencies, Métis governance, and First Nations will be invited again to participate, this time with implementation of the plan. More information about the implementation of this plan can be found in section 6 of this document (please see page 43).

3. Framework

The model for watershed and aquifer planning in Saskatchewan was developed shortly after the Saskatchewan Watershed Authority was formed in October 2002. It is believed that the management and protection of Saskatchewan's water resources is best served when stakeholders collaborate through frank rapport and mutual respect, and then commit to actions that support a common goal. The goal of watershed planning is to protect the quality and quantity of source waters.

Because of the broad base of interests that the planning committee members brought forward, the parameters of source water protection were extended to include many direct and indirect aspects of water management.

The Recommendations and Key Actions put forward in this Watershed Protection Plan include:

- information regarding the context and background of each Recommendation and Key Action;
- a time frame for implementing each Recommendation or Key Action;
- an identified lead agency or organization for each Recommendation or Key Action, with expectations that the identified agency or organization will consider ways and means of accomplishing at least part of the said recommendation or action.

4. Introduction to Source Water Protection

4.1 One Step in the Multi-Barrier Approach to Drinking Water Protection

Drinking water supplies can be broken down into three parts: the source water, the water treatment system, and the distribution system that transports treated water to homes, businesses, schools, and other buildings. As drinking water travels to the tap, it could become contaminated in many ways. A multi-barrier approach to protecting drinking water supplies is one preventive risk management technique in which all known and potential hazards are identified and barriers are put in place to reduce or eliminate the risk of contamination.

The implementation of this Watershed Protection Plan represents the first barrier in protecting source water. It cannot be stressed enough that source water protection is only the first barrier of defence against contamination that can lead to waterborne diseases or illnesses. Another key barrier is the routine treatment of water, usually by chlorination, and continual removal of unwanted elements such as bacteria, viruses, and organisms, through treatments such as reverse osmosis and filtering. The only way of knowing what treatment the water supply needs is to have an expert do a comprehensive test of the source water, and then implement recommended measures to reduce risk. Saskatchewan communities are required to meet strict standards regarding the testing and treatment of their water supplies. The same cannot be said for private water supply systems. Although people are encouraged to test their water supply, most limit it to the testing available from the provincial laboratory for both E. coli and nitrates.

All watershed residents have an interest in protecting source water and, as such, all should be responsible for the implementation of this Watershed Protection Plan. Everyone should and can do their part. That includes big parts, such as being a councillor for a city or rural municipality which is responsible for the drinking water of hundreds of people, or small parts, such as urban people being educated about where water comes from and where wastewater goes, practicing stewardship, or testing and treating the water on your own farm. Get involved and do your part!

4.2 Secondary Benefits of Protecting Source Water: Quality and Quantity

4.2.1 Quality

Protecting source water can mean removing and/or reducing known point sources of pollution and accumulative non-point source pollution. It can also mean maintaining nature's own purification systems and not overloading them.

Source water protection comes in many forms: protecting specific ecosystems such as wetlands that remove contaminants and purify our drinking water; protecting water for recreational uses such as swimming and boating; and maintaining water supplies for livestock use, and for the protection of wildlife and fish habitats. Source water protection also means having healthy riparian areas which remove sedimentation that potentially carries waterborne chemicals, and protecting upland areas that have the most human activity and can have a potentially negative effect on runoff water quality.

Riparian areas are the transition zones between upland areas and wetlands, streams or lakes. Due to increased water availability, this zone is usually characterized by dense vegetation.

A wetland is an area that is saturated by surface or ground water, with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries. Wetlands are a source of water, forage, and wildlife habitat, and perform a number of important functions such as ground water recharge, water storage, flood control, sediment and residue trapping, shoreline protection, and nutrient cycling and storage.

When source water is of the highest natural quality, the treatment required before people can safely consume it is less costly and less complex. Potential health risks posed by the failure of treatment systems are also reduced when the source water is high in quality.

There are economic benefits to having higher quality water available for use by different industries, such as manufacturing and value-added agriculture. Often a good quality, high quantity water source can be the driving force that entices an industry to locate in a particular area.

4.2.2 Quantity

Water is a renewable resource. Water is fully replenished during the hydrological cycle, but depending where it is found, this will take place at very different rates. For instance, the complete recharge of oceanic waters takes about 2,500 years, permafrost and ice about 10,000 years, and deep ground water and mountainous glaciers about 1,500 years. Water stored in lakes is fully replenished over 17 years, and in rivers about every 16 days. Surface water and ground water are directly related and form a part of the hydrological cycle. Ground water that is close to the surface can be influenced in both quality and quantity by surface activities, while deeper ground water is usually much less influenced by surface activities. Ensuring water supplies are available for people and nature for now, as well for our future generations, requires us to take the natural fluctuations of water supplies into account. While the potential effects of climate change are still being debated, what is not debatable is that there will be droughts, there will be floods, and as such, we should plan to mitigate the effects of these natural occurrences.

5. Planning Objectives, Recommendations and Key Actions

5.1 Watershed Risks and Stressors

The Watershed Advisory Committee indicated a strong concern over the long-term sustainability of water within the Swift Current Creek watershed in respect to both quality and quantity. Water supply is threatened by such factors as climate change, future growth in water demands, and extended hydrologic droughts. The Committee identified an interest in possibly supplying water from the South Saskatchewan River for municipal, industrial and irrigation purposes.

Committee members were concerned about waterfront developments on lakes within the Swift Current Creek watershed. Their concern focused on the impact development has on riparian areas and long-term consequences for the fisheries. Comments made during the meetings highlighted an interest in more public consultation during the municipal subdivision reviews for cottage developments.

A water quality assessment included in the Swift Current Creek Watershed Background Report shows that water quality in the Swift Current Creek watershed ranges from fair to good as assessed using the water quality index. Water quality can fluctuate due to both natural variability (e.g. geology, climate variability) and human influences. One of the first goals with respect to safe guarding surface water quality is to identify human activities that may result in its degradation. The State of the Watershed Report, prepared and published by the Saskatchewan Watershed Authority, is a risk assessment tool that summarizes such potential stressors to water quality. The report provided a basis for identifying relevant stressors within the Swift Current Creek watershed and developing Recommendations and Key Actions based on those stressors.

A common theme among a majority of the potential stressors is the risk of increased nutrient loading to surface water. Therefore, one set of Key Actions developed through the planning process focused on reducing nutrient loading from all sources within the Swift Current Creek watershed. In order to accomplish these actions, it is recommended that site-specific nutrient objectives be calculated at the long-term water quality monitoring sites.

For each Key Action, the agency bolded in the Responsibility section will be the lead agency. If two agencies are bolded, each will be considered a co-lead for implementing the Key Action.

PLANNING OBJECTIVE

Implement a risk management approach for long-term threats to water quantity and quality in the Swift Current Creek watershed that will identify threats, gather information, and develop strategies to mitigate those threats.

Recommendation

Research the impact of climate change on water supply, including the variability in flow regimes in the creek, and develop mitigation strategies.

KEY ACTION 1: Develop mitigation strategies to deal with natural climate variability and cyclical flow regimes in Swift Current Creek.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Swift Current Creek Watershed Stewards	Ongoing	Medium

KEY ACTION 2: Determine/estimate extreme cyclical variations and how best to manage them.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Swift Current Creek Watershed Stewards	Ongoing	Medium

KEY ACTION 3: Use historical events to better understand and quantify future events.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Swift Current Creek Watershed Stewards	Ongoing	Medium

Recommendation

Research and implement measures for drought preparedness, including organization of a drought preparedness workshop.

KEY ACTION 4: Develop water supply availability information including surface and ground water; identify communities at risk; and organize a drought preparedness workshop.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority **Agriculture and Agri-Food Canada – Agri-Environmental Services Branch** Swift Current Creek Watershed Stewards Saskatchewan Ministry of Agriculture	Ongoing Drought preparedness workshop to be completed by 2010	High

Recommendation

KEY ACTION 5: Conduct a feasibility study and evaluation on the option of bringing in water from the South Saskatchewan River for municipal, industrial and irrigation purposes. This study would also consider whether the current amount of water within the Swift Current Creek is sufficient to meet future use by local communities and industries.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Southwest Enterprise Region Saskatchewan Watershed Authority Agriculture and Agri-Food Canada – Agri-Environmental Services Branch Municipalities Irrigation Districts	Initiate in 2012	Medium

PLANNING OBJECTIVE

To gain an understanding of the cumulative impacts of stressors in the watershed and then develop targeted programming to address those with the greatest impacts.

Recommendation

Agencies should collaborate to reference cumulative loading issues identified in the Swift Current Creek Monitoring Project report.

KEY ACTION 6: Determine the significant stressors in the watershed and target activities to address those with the greatest cumulative impacts.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority **Saskatchewan Ministry of Environment** Swift Current Creek Watershed Stewards	Ongoing Complete in 2011	Medium

PLANNING OBJECTIVE

Encourage local municipalities to adopt methods of land use zoning around waterfronts based on lake carrying capacity.

Recommendation

Determine recreational development carrying capacity for recreational lakes within the watershed. Encourage municipalities to adopt the findings for land use zoning around the lakes.

KEY ACTION 7: Coordinate and facilitate the determination of lake carrying capacities for lakes within the watershed.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Municipalities	Initiate in 2011	Low

Recommendation

Encourage rural and urban municipalities to complete planning studies and implement zoning bylaws regarding waterfront development.

KEY ACTION 8: Encourage rural and urban municipalities to develop zoning and official community plans regarding waterfront developments.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards	Ongoing	Low

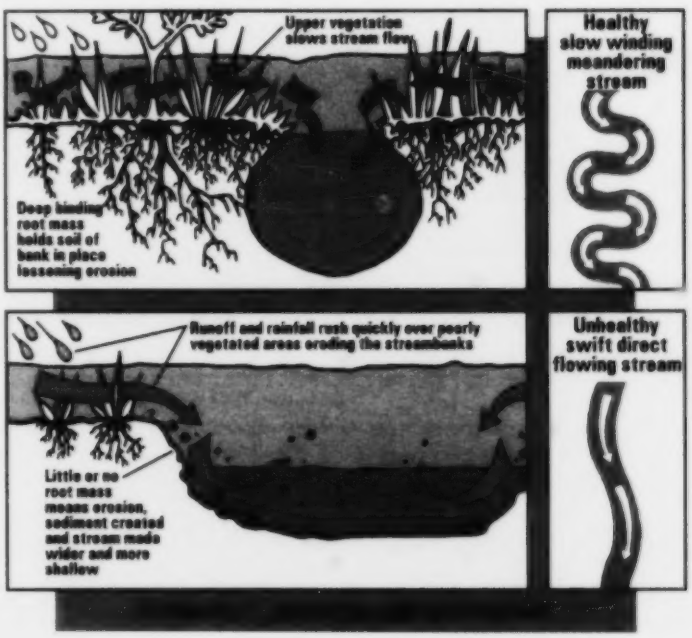
5.2 Watershed Stewardship, Education and Communications

The Swift Current Creek Watershed Stewards have had numerous successes in the area of watershed education since the group's formation in 1998. For instance, students from the local schools have been engaged in awareness programs such as the Froghoppers Water Workshop. Or, as another example, agricultural producers have attended workshops on improving riparian health and invasive plant species through the Agri-Environmental Group Plans. The Watershed Advisory Committee indicated strongly that this work should continue and expand in the future. In addition, discussions highlighted the need for a communication plan that encompasses the existing programs and sets direction for the future.

Another topic of discussion during the Committee meetings was the importance of ecological goods and services. Ecological goods and services, also referred to as natural capital, are the benefits arising from the ecological functions of healthy ecosystems. For example, the protection of riparian areas provide multiple benefits to society, including improved flood control, clean water, recreational opportunities, and climate regulation.

One aspect of watershed stewardship is riparian function and aquatic habit. Current research indicates that the health of riparian areas across Saskatchewan is varied. According to assessments completed over the last decade, the riparian areas along the Swift Current Creek and its tributaries average as 15 percent Functioning, 64 percent Functioning at Risk, and 21 percent Non-functioning. In addition, the Saskatchewan Watershed Authority's State of the Watershed Report notes that aquatic habitat fragmentation, the ecological process in which a large patch of habitat is divided into smaller patches of habitat, is a potential stressor in the watershed.

Riparian areas can effectively control erosion by forming a physical barrier that slows the surface flow of sediment and debris, by stabilizing wetland edges and streambanks, and by promoting water infiltration. The required width of a riparian buffer is determined by the type of vegetation present, the extent and impact of the adjacent land use, and the functional value of the receiving wetland. Studies have found the bulk of sediment removal in surface runoff occurs in the first few meters of the buffer zone. A vegetative buffer strip can effectively remove 75 to 97 percent of the sediment load from surface runoff.


Upper vegetation slows stream flow
Deep binding root mass holds soil of bank in place lessening erosion
Healthy slow winding meandering stream
Runoff and rainfall rush quickly over poorly vegetated areas eroding the streambanks
Little or no root mass means erosion, sediment created and stream made wider and more shallow
Unhealthy swift direct flowing stream

Buffer strips can also effectively remove nutrients from surface water flow. The main mechanisms of nitrate removal are uptake by vegetation roots and anaerobic microbial denitrification in the saturated zone of the soil. Relatively narrow buffers seem to be very effective in reducing 35 to 96 percent of nitrogen. Phosphorus reduction has been found to be 27 to 97 percent effective in buffer strips that contain both woody, herbaceous vegetation, grasses, and cropped buffer systems.

Buffer strips can also trap a significant proportion of pathogens (up to 74 percent of fecal coliforms). Low soil moisture and high soil temperature substantially decrease survival of total and fecal coliform bacteria.

Finally, buffer strips also trap and retain pesticides via infiltration. Grass buffer strips can reduce pesticides by 8 to 100 percent.

One major threat to riparian health that the Watershed Advisory Committee identified is the presence of invasive plants and noxious weed species. Invasive plants and noxious weeds threaten the biodiversity of the watershed and affect the riparian areas along watercourses. Invasive plants can be transferred along the watercourses, or they can also be transported by the wind.

As with other agricultural areas of Saskatchewan, the land within the Swift Current Creek watershed is primarily held by private landowners. One of the best methods to encourage healthy riparian areas and changes to land use is through stewardship education directed to these landowners. Communication tools are also beneficial as they help make both urban and rural residents aware of the importance of riparian areas. Stewardship actions can also be used to help educate the administration of the City of Swift Current, urban landowners, and golf course managers about the importance of maintaining riparian buffers.

Photo courtesy of Swift Current Creek Watershed Stewards

Photo courtesy of Swift Current Creek Watershed Stewards

PLANNING OBJECTIVE

Provide information to watershed residents in order to increase their knowledge and understanding of the fundamental social, economic, and environmental values of water, and how residents can act to protect the quality and quantity of water in their watershed.

Recommendation

Continue and enhance the educational programming provided by the Swift Current Creek Watershed Stewards.

KEY ACTION 9: Educate the public in watershed stewardship through activities such as, but not limited to:

- Frog Hoppers student stewardship workshops;
- Swift Current Creek Watershed Stewards field days;
- workshops;
- Know Your Watershed newsletters;
- media releases; and
- Enviroforum.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Ministry of Environment Saskatchewan Watershed Authority Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc. Any other supporting agencies Interested stakeholders	Ongoing	Medium

Recommendation

The Swift Current Creek Watershed Stewards should develop a communications strategy that encompasses existing and future programs and sets direction for the future.

KEY ACTION 10: Identify long-term funding sources for implementation of the communications strategy.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority	Ongoing	Medium

PLANNING OBJECTIVE

Educate watershed residents and develop programming regarding the value of ecological goods and services provided by:

- agriculture industry (for wildlife);
- reservoirs (for fisheries and recreation, and for moving cattle away from riparian areas);
- filtration and protection of water quality;
- carbon sequestration; and
- maintaining existing abandoned farmsteads, shelterbelts, native habitat and wetlands.

Recommendation

Provide information and knowledge regarding the value of ecological goods and services to watershed stakeholders through extension activities.

KEY ACTION 11: Develop extension activities to provide information on the value of ecological goods and services to stakeholders.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Wildlife Federation	Ongoing	Medium

Recommendation

Explore options to develop a project with a watershed-specific approach and a current valuation of ecological goods and services in the Swift Current Creek watershed.

KEY ACTION 12: Engage third parties in the development of a project with a watershed-specific approach and a current valuation of ecological goods and services in the Swift Current Creek watershed.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Agriculture and Agri-Food Canada – Agri-Environmental Services Branch Saskatchewan Watershed Authority Saskatchewan Wildlife Federation Saskatchewan Ministry of Agriculture Saskatchewan Ministry of Environment University of Saskatchewan University of Regina University of Alberta Saskatchewan Stock Growers Association Municipalities Enterprise Saskatchewan Southwest Enterprise Region Any other supporting agencies	Initiate in 2010 Complete in 2013	Medium

KEY ACTION 13: Develop materials and presentations highlighting watershed values for municipal councils.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards	Initiate in 2010	Medium

PLANNING OBJECTIVE

Develop and implement a variety of strategies to protect aquatic life and improve and maintain riparian function in the Swift Current Creek watershed.

Recommendation

Monitor riparian area health/function within the Swift Current Creek watershed with the objective of improving riparian area health/function.

KEY ACTION 14: Apply the riparian function monitoring protocol and direct programming to improve riparian function.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc.	Ongoing	Low

Recommendation

Residential, commercial and industrial development in the Swift Current Creek watershed should occur in a responsible, environmentally-sensitive manner.

KEY ACTION 15: Have a package available in municipal offices for residential, commercial and industrial developers. This package should include information on existing legislation and any other information the municipality deems necessary.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Ministry of Environment Saskatchewan Ministry of Municipal Affairs Cypress Health Region Public Health Inspection Saskatchewan Watershed Authority Fisheries and Oceans Canada Agriculture and Agri-Food Canada – Agri-Environmental Services Branch Other agencies	Ongoing	Low

KEY ACTION 16: Encourage municipalities to access the resources available through the Saskatchewan Association of Rural Municipalities, the Saskatchewan Urban Municipalities Association and the Saskatchewan Ministry of Municipal Affairs.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Association of Rural Municipalities Saskatchewan Urban Municipalities Association Saskatchewan Ministry of Municipal Affairs	Ongoing	Low

Recommendation

Use agricultural programs to improve or maintain riparian habitat.

KEY ACTION 17: Promote agricultural Beneficial Management Practices through various programs, such as Agri-Environmental Group Plans. Examples of Beneficial Management Practices include maintenance of riparian buffers, offsite watering, and winter site management.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Ministry of Agriculture Agriculture and Agri-Food Canada Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc.	Ongoing	High

KEY ACTION 18: Offer to coordinate or partner with other agencies to deliver noxious weed and invasive plant programming for municipalities in the Swift Current Creek watershed.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Ministry of Agriculture Interested municipalities	Ongoing	Medium

Recommendation

Promote the voluntary protection of riparian, wetland and upland habitat through education and communication programs.

KEY ACTION 19: Refer landowners interested in voluntary land protection options to land stewardship organizations such as the local Saskatchewan Wildlife Federation branches.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Local Saskatchewan Wildlife Federation branches Municipalities Saskatchewan Ministry of Agriculture Saskatchewan Ministry of Environment	Ongoing	Low

KEY ACTION 20: Improve and maintain riparian health in the entire watershed through delivery of educational and communication activities targeting recreational users, rural residents and urban residents in the watershed.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority Agriculture and Agri-Food Canada – Agri-Environmental Services Branch Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc.	Ongoing	Medium

PLANNING OBJECTIVE

Due to the threats to biodiversity and healthy riparian areas, develop education, monitoring and control measures to reduce invasive plants and noxious weeds within the Swift Current Creek watershed.

Recommendation

Use existing products and strategies to address invasive plants and noxious weeds.

KEY ACTION 21: Apply the Swift Current Creek Watershed Stewards' Integrated Weed Management Plan.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Municipalities Saskatchewan Ministry of Agriculture Saskatchewan Association of Rural Municipalities	Ongoing	Medium

KEY ACTION 22: Prioritize a list of invasive plants posing a potential threat to the watershed and develop programming to assess and monitor areas, with the intent of decreasing invasive plant populations through control measures.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards	Ongoing	Medium

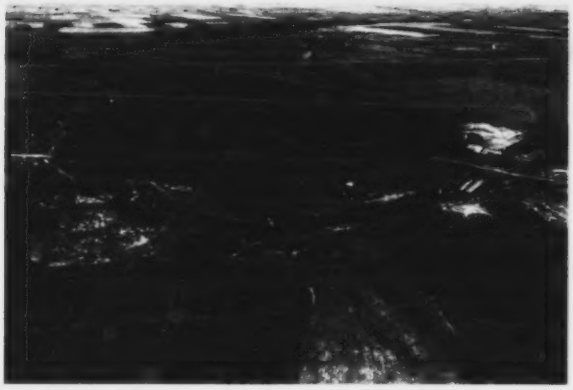
Recommendation

Develop and undertake education activities to reduce invasive plants and noxious weeds in the Swift Current Creek watershed.

KEY ACTION 23: Organize invasive plant and noxious weed field days, as well as develop and share extension materials.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority	Ongoing	Medium

5.3 Watershed Management



The Swift Current Creek watershed is located in the semiarid Palliser Triangle of southern Saskatchewan, thus the area is susceptible to frequent and often severe droughts[1]. Much of the watershed's surface water runoff occurs for a short period in the spring, with a portion of this runoff retained by dams such as the Duncairn Dam. Due to extensive irrigation projects and demands for community water supplies, water management and allocation were identified as major concerns by the Watershed Advisory Committee.

The Swift Current Creek supplies municipal water to the City of Swift Current, as well as to the Town of Herbert through the Swift Current Main Canal. Other communities in the watershed, such as the town of Shaunavon and the villages of Dollard, Waldeck, Rush Lake, and Morse, rely on ground water for their municipal supply.

Discussion during the planning process indicated the need for a water management strategy that balances the interests of all of the users in the long-term. One of the main topics regarded who gets first access to the water between the existing users. Members of the Watershed Advisory Committee reiterated that the primary purposes behind the construction of Duncairn Dam were for irrigation and municipal water for the City of Swift Current.

In 1981, the Province of Saskatchewan enacted a moratorium on all new water allocations within the Swift Current Creek watershed. The Watershed Advisory Committee has requested that a review of this moratorium be conducted, including a water supply study. If water is found to be available, it was recommended that the Committee and existing users be consulted in any discussions regarding new allocations. On a related topic, the Committee was provided with information on the regulatory framework for allocation of water licences in Saskatchewan. Much discussion occurred on the legal difference between water licenses and water rights.

Another issue related to water management is development within the floodplain inside the City of Swift Current and rural residential properties alongside Swift Current Creek. A similar issue is that some municipalities are using a 1:200 year flood event for community zoning, rather than the 1:500 year flood event recommended by the Saskatchewan Ministry of Municipal Affairs and the Saskatchewan Watershed Authority.

Photo courtesy of Saskatchewan Ministry of Agriculture

A 1:200 year flood event represents a 0.5 per cent chance of flooding in any given year, while a 1:500 flood event represents a 0.2 per cent chance of flooding in any given year.

For example, the City of Swift Current is restricting new development to the 1:500 level, but many existing properties are situated below this level. Committee members indicated that several of the Rural Municipalities within the watershed do not have official community plans or zoning bylaws to manage more intensive development along Swift Current Creek.

The Watershed Advisory Committee was also concerned about the issue of storm water releases in Swift Current Creek within urban areas. Urban storm water is known to contain contaminants such as road salt, oil, and fertilizer. Several actions were recommended to educate communities and watershed residents on this issue.

PLANNING OBJECTIVE

The Committee requests the development of a long-term water management strategy for the watershed which would include the following interests and stakeholders:

- irrigators;
- the City of Swift Current;
- other communities;
- industries;
- domestic and agricultural users;
- fish and wildlife;
- infrastructure management;
- recreational users; and
- Reid Lake (Duncairn Reservoir) and Reed Lake (Morse Lake).

Recommendation

Develop a long-term water management strategy for the watershed which would include the noted stakeholders and interests. The strategy should identify who gets first access to the water between the users. Interests and stakeholders include:

- irrigators;
- the City of Swift Current;
- other communities;
- industries;
- domestic and agricultural users;
- fish and wildlife;
- infrastructure management;
- recreational users; and
- Reid Lake (Duncairn Reservoir), Reed Lake (Morse Lake).

KEY ACTION 24: Develop a long-term water management strategy.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Agriculture and Agri-Food Canada – Agri-Environmental Services Branch Stakeholder groups	Complete in 2014	High

PLANNING OBJECTIVE AND RECOMMENDATION

Improve understanding among all reservoir users regarding water allocations from the Duncairn and Highfield Reservoirs.

KEY ACTION 25: Provide education and information on water allocations from the Duncairn and Highfield Reservoirs.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards **Saskatchewan Watershed Authority**	Ongoing	High

KEY ACTION 26: Encourage the removal of operational limitations on the Rush Lake Irrigation Project by resolving outstanding issues of land control on Reed Lake.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority Agriculture and Agri-Food Canada – Agri-Environmental Services Branch Rush Lake Irrigation District Board Rural Municipalities of Morse, Excelsior, and Coulee Towns of Herbert and Morse	Ongoing	High

PLANNING OBJECTIVE AND RECOMMENDATION

Strive to conserve and optimize flows in the Swift Current Creek while maintaining a base flow and natural variability.

KEY ACTION 27: Identify the management process on how to deliver water to users in the watershed.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Agriculture and Agri-Food Canada – Agri-Environmental Services Branch City of Swift Current	Complete in 2011	High

PLANNING OBJECTIVE AND RECOMMENDATION

Initiate a review of the 1981 moratorium on irrigation water allocation and investigate the three options of:

- re-allocating the unallocated water to new users;
- re-evaluating availability of water for existing users; or
- evaluating existing reservoir operating rules.

KEY ACTION 28: Complete an updated Water Supply Study that includes:

- a consultation process to determine how excess water will be allocated; and
- a re-evaluation of the availability of water for existing users.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Swift Current Creek Watershed Stewards	Initiate in 2009 Complete study in 2010 Enter consultation in 2011	High

PLANNING OBJECTIVE AND RECOMMENDATION

Initiate a study that includes all of the irrigation water users to identify their water use.

KEY ACTION 29: Survey irrigation users to establish actual water use to ensure validity and current status of licence.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Swift Current Creek Watershed Stewards	Initiate in 2009	High

PLANNING OBJECTIVE AND RECOMMENDATION

Following completion of the Water Supply Study, the Watershed Advisory Committee and the water users will provide input to the Saskatchewan Watershed Authority regarding how additional water should be allocated throughout the basin.

KEY ACTION 30: Consult with the Swift Current Creek Watershed Stewards and users on how additional water should be allocated throughout the basin.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Swift Current Creek Watershed Stewards Agriculture and Agri-Food Canada – Agri-Environmental Services Branch	Initiate in 2009 Complete in 2014	High

PLANNING OBJECTIVE AND RECOMMENDATION

Review the planning processes and methodology used to develop water management plans in other provinces and jurisdictions to determine their applicability for the Duncairn and Highfield Reservoirs.

KEY ACTION 31: Make recommendations to the stakeholders and water users in the Swift Current Creek watershed after review of existing water management plans.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards	Complete in 2010	High

PLANNING OBJECTIVE

Sustainable management of surface water supplies in the Swift Current Creek requires a firm understanding of the natural flow regime; current uses and allocation; and threats to both the quantity and quality of the supply.

Recommendation

Monitor and manage treated effluent releases into the Swift Current Creek to minimize fluctuations in creek flows during the winter months.

KEY ACTION 32: Provide a consistent flow from the waste water treatment plant in order to minimize winter flow fluctuations for downstream stakeholders.

Responsibility	Time Frame	Priority
City of Swift Current Saskatchewan Ministry of Environment	Ongoing	Medium

Recommendation

A study of oxygen depletion and winterkill risk for fish is needed to help determine whether the irrigation cut-off elevation at Duncairn Reservoir can be lowered.

KEY ACTION 33: Conduct a study of oxygen depletion and winterkill risk for fish in Duncairn Reservoir.

Responsibility	Time Frame	Priority
Saskatchewan Ministry of Environment	Initiate in 2010	Medium

Recommendation

KEY ACTION 34: Evaluate the in-stream flows and user needs downstream of the Duncairn Reservoir in all seasons.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority	Complete in 2010	Medium

PLANNING OBJECTIVE

Ensure that new developments and re-developments near lakes and streams are not at undue flood risk and do not pose undue threats to the aquatic and riparian environment.

Recommendation

A risk assessment that takes into consideration the impacts of runoff (storm water) and flood potential within the urban communities, rural residential subdivisions, and recreational subdivisions in the Swift Current Creek watershed should be developed.

KEY ACTION 35: Work with municipalities to undertake a risk assessment of the impacts of runoff and flood potential within the urban communities, rural residential subdivisions and recreational subdivisions in the watershed.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority	Initiate in 2010 Complete in 2014	Medium

Recommendation

The Committee should explore the option of encouraging municipalities to develop official community plans that protect source waters by managing storm water and the density of development.

KEY ACTION 36: Through extension activities, encourage municipalities to develop official community plans that protect source waters by managing storm water in new developments.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Ministry of Environment	Initiate in 2010	Medium

Recommendation

Rural and urban municipalities should be encouraged to develop and enforce zoning bylaws that restrict development within the floodplain and those that alter the channel of the Swift Current Creek to the 1:500 year flood levels.

KEY ACTION 37: Encourage rural and urban municipalities to develop and enforce zoning bylaws that restrict development within flood prone areas and those that alter the channel of Swift Current Creek to the 1:500 year flood levels.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Ministry of Municipal Affairs Saskatchewan Watershed Authority	Initiate in 2009	Medium

Recommendation

Municipalities and landowners should be encouraged to restrict development in wetland or potential wetland areas.

KEY ACTION 38: Through education, encourage municipalities and landowners to retain or restore wetlands.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards **Ducks Unlimited Canada** Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc.	Ongoing	Medium

Recommendation

The Government of Saskatchewan should review the Flood Damage Reduction Program to encourage redevelopment in non-flood-prone areas.

KEY ACTION 39: Review the Flood Damage Reduction Program to encourage redevelopment in non-flood-prone areas.

Responsibility	Time Frame	Priority
Saskatchewan Ministry of Municipal Affairs **Saskatchewan Watershed Authority**	Initiate in 2009	Medium

Recommendation

The Swift Current Creek Watershed Stewards should extend an invitation to municipalities in the watershed to access technical knowledge and input from the Swift Current Creek Watershed Stewards when undertaking planning activities.

KEY ACTION 40: Encourage municipalities in the watershed to access available resources and technical knowledge from the Swift Current Creek Watershed Stewards when undertaking planning activities.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Municipalities	Initiate 2010	Medium

PLANNING OBJECTIVE

Information is required on the relative impacts on surface water quality from residential storm water runoff and runoff from urban areas, including impacts due to:

- fertilizer and herbicide use on lawns;
- car washing and oil changing in driveways; and
- disposal of chemicals in storm sewers.

KEY ACTION 41:

- Produce a newsletter and educational materials highlighting the impacts of storm water runoff on Swift Current Creek.
- Continue or expand storm water runoff education work with schoolchildren.
- Host urban storm water runoff workshops for residents.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority City of Swift Current	Ongoing	Medium

PLANNING OBJECTIVE

Information is required on the impacts of commercial/industrial storm water, including impacts due to:

- construction runoff;
- road salt runoff; and
- runoff from commercial and industrial parking lots.

Recommendation

The Canadian Wildlife Federation should review Project Wild for inclusion of storm water runoff issues, and if they are currently missing, include information and activities on these issues. The Canadian Water Resources Association should review Project WET for inclusion of storm water runoff issues, and if they are currently missing, include information and/or activities on these issues.

KEY ACTION 42: Contact the relevant agencies to ensure inclusion of storm water issues in Project WET (Canadian Water Resources Association) and Project Wild (Canadian Wildlife Federation).

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Canadian Wildlife Federation Canadian Water Resources Association	Initiate in 2009	Medium

PLANNING OBJECTIVE

Raise public awareness regarding the impact of residential storm water and urban runoff on water quality in the Swift Current Creek.

Recommendation

Encourage best management practices for storm water runoff within the urban residential, commercial, and industrial sectors.

KEY ACTION 43: Promote best management practices for storm water runoff within the urban residential, commercial, and industrial sectors.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards	Ongoing	Medium

PLANNING OBJECTIVE

Increase the understanding among watershed residents regarding water allocation and licensing.

Recommendation

Educate watershed residents about water allocation and licensing processes in Saskatchewan.

KEY ACTION 44: Provide information regarding water allocation and licensing within Swift Current Creek Watershed Stewards publications and on the Swift Current Creek Watershed Stewards' website. This should including information from Saskatchewan Watershed Authority publications and links to the Saskatchewan Watershed Authority's website.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority	Complete in 2009	Medium

Recommendation

The Swift Current Creek Watershed Stewards shall initiate ongoing education on source water protection in cooperation with the oil and gas industry, mineral developers and regulatory agencies.

KEY ACTION 45: Work with the oil and gas industry, mineral developers and regulatory agencies to promote source water protection through:

- participation by all parties in field exercises;
- opportunities for field days in conjunction with the Swift Current Creek Watershed Stewards;
- a joint media information release and/or newsletter from Swift Current Creek Watershed Stewards, the Saskatchewan Mining Association, and the Canadian Association of Petroleum Producers on protecting our water supply.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards (newsletter) Canadian Association of Petroleum Producers Saskatchewan Petroleum Industry Government Environment Committee (field days) Saskatchewan Mining Association	Complete newsletter in 2009 Ongoing (Other)	Low

PLANNING OBJECTIVE

Set site-specific water quality objectives (such as phosphorus, nitrogen, sulphur, and sodium) for the Swift Current Creek watershed, and implement a variety of activities to meet those objectives.

Recommendation

Site-specific nutrient objectives shall be calculated at the long-term water quality monitoring sites.

KEY ACTION 46: Use available data to set site-specific water quality objectives for identified nutrients.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards **Saskatchewan Watershed Authority**	Complete in 2014	Low

Recommendation

Based on the findings of the Swift Current Creek water quality monitoring program, implement a variety of activities to meet those objectives.

KEY ACTION 47: Identify and implement strategies to meet the site-specific water quality objectives set in Key Action 46.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority Saskatchewan Ministry of Agriculture Saskatchewan Ministry of Environment Agriculture and Agri-Food Canada – Agri-Environmental Services Branch Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc.	Ongoing	Low

Recommendation

Ongoing water quality monitoring should occur within the Swift Current Creek watershed.

KEY ACTION 48: Continue to monitor water quality throughout the watershed.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority Saskatchewan Ministry of Agriculture Saskatchewan Ministry of Environment	Ongoing	Low

Recommendation

The Saskatchewan Watershed Authority's State of the Watershed Report should incorporate data from the Swift Current Creek Watershed Stewards' water quality monitoring program.

KEY ACTION 49: Encourage the sharing of all water quality monitoring results to stakeholders through a common database.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards	Initiate in 2010 Complete in 2011	Low

KEY ACTION 50: Recommend that the Saskatchewan Watershed Authority include local data in the State of the Watershed Report.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority	Ongoing	Low

5.4 Water Conservation

Photo courtesy of Swift Current Museum

A secure and high quality water supply is essential to human health, and is also a key driver of economic expansion. The purpose of conserving water revolves around meeting those needs while ensuring an adequate supply remains for environmental considerations and future development. One of the objectives of Saskatchewan's Safe Drinking Water Strategy is reduced consumption of water, reflecting a broad commitment to both water quality and quantity issues, and a commitment to addressing issues around supply and demand management.

Traditional water management has focused on increasing supplies. However, in many areas of the world, water demand is reaching or exceeding the sustainable supply, prompting concerns of a global water crisis and drawing attention to conservation as an effective means of improving water availability.

Water conservation seeks to reduce water use through the promotion of more efficient water use and the elimination of waste. Water conservation does not necessarily mean total water withdrawals will decline. Economic growth creates new demands for water. A successful water conservation program will mean that water withdrawals will grow more slowly than they otherwise would have. For example, there is potential in Saskatchewan for increased irrigation. If the number of irrigated acres were to increase significantly, total water use would probably increase as well, but not as much as it would have without conservation measures. Efficiency or productivity per unit of water would improve.

Canadians are the second highest water users in the world. While the high water use reflects aspects of our economy, it also shows that there is significant potential to conserve water. Canadians, at least in urban centres, use much more water for domestic purposes than most developed countries. The average urban Canadian uses 343 litres per capita per day residentially. In Saskatchewan, average residential daily per capita use was 293 litres per day in 2003. When considering all community uses (commercial, recreational and industrial systems found within a municipality) the average use for 2003 was 375 litres per capita per day.

One advantage of water conservation is that it can increase economic efficiency and thus reduce costs. Pumping water requires significant amounts of energy and carbon dioxide emissions. This activity can be a major cost for irrigators and for municipalities. Wise use of water will save energy, thus reducing costs for water users. Similarly, reducing water use reduces the need for new infrastructure and other related costs. If a community can grow within its existing water supply, it can avoid expensive expansions to water treatment and other water facilities. This produces direct savings to users.

A second benefit is that water conservation makes water available for other uses, allowing new economic opportunities. While the importance of this is greatest in areas where water is fully allocated, efficient use of all resources is an essential component of a sustainable economy. In addition, as climate change places pressure on water supplies and further development adds water demand, the value of available water supplies will increase. Within the context of overall water management and conservation, emphasis on long-term sustainability benefits our environment, our health and our economy. From an environmental and health perspective, water conservation policies ensure that quantity and quality requirements are sustained relative to supply and demand in both short and long-term planning. From an economic perspective, proactive and progressive water conservation policies offer significant potential in terms of enhancing and improving Saskatchewan's advantages in terms of growth and expansion. Whether it is at the industrial input level or as a factor affecting our quality of life, water quantity, and quality will continue to increase in importance and influence the location of socioeconomic development and population concentrations.

The environment also benefits from water conservation. Each river and lake is an ecosystem. As water is removed from aquatic systems, they become stressed. The greater the percentage of water removed, the less that remains for natural processes such as in-stream flows that support fish and other life. Thus, water conservation helps to maintain healthy ecosystems, protect biodiversity and maintain an attractive environment and contribute to our health and quality of life. Water conservation will help Saskatchewan reduce its greenhouse gas emissions, both by saving water for hydroelectric generation and by reducing the energy required to pump water.

In Saskatchewan, water availability ranges from very large available water supplies in much of northern Saskatchewan, to some southwestern watersheds where no new surface water allocations are being made due to supply constraints. The Swift Current Creek watershed falls into the latter category. Water supplies also vary significantly depending on where one is located within a watershed. In areas of higher water demand, compared to supply, conservation measures would produce a greater return than in areas of relative water abundance. Nonetheless, water conservation in any area can yield benefits to the ecosystem, to quality of life, and to the economy.

PLANNING OBJECTIVE

Determine and implement Beneficial Management Practices that would promote water conservation by urban residents, municipalities, agriculture, and industry within the watershed.

Recommendation

KEY ACTION 51: Research and implement water conservation measures which would allow population and economic growth without increasing overall water consumption.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority Municipalities	Ongoing	High

Recommendation

KEY ACTION 52: Research the best products to conserve water (e.g. low-volume toilet comparisons).

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority **Swift Current Creek Watershed Stewards**	Complete in 2010	High

Recommendation

Partner with other agencies to develop and promote Beneficial Management Practices and innovative ideas for water conservation.

KEY ACTION 53: Partner with the Saskatchewan Watershed Authority and conservation organizations to develop and promote Beneficial Management Practices and innovative ideas for urban, agricultural, and industrial water users to conserve water.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority Saskatchewan Ministry of Agriculture Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc. Municipalities	Ongoing	High

Recommendation

Work with municipalities to promote water conservation.

KEY ACTION 54: Develop incentives for people to make water-conserving choices (e.g. using low-volume toilets, energy star appliances, and timers for sprinkler systems).

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Swift Current Creek Watershed Stewards Saskatchewan Ministry of Environment Municipalities	Ongoing	High

5.5 Aquifer and Ground Water Protection

Ground water is a significant source of drinking water for the communities and rural residents within the watershed, principally the Town of Shaunavon. Overall, approximately 45 percent of Saskatchewan's population[2] and 62 percent of Saskatchewan communities rely on ground water as their primary water source[3]. Protecting both the quality and quantity of ground water is extremely important.

Measuring ground water quality and quantity is a difficult task. Data indicating the amount of ground water available are limited in the areas covered by the Swift Current Creek watershed. The actual quantity of water available for use is difficult and expensive to estimate, and there are limited resources within government and academia to conduct the necessary research.

Ground water can become contaminated from numerous activities or sources, including gravel extraction, septic systems, and agriculture practices. Ground water quality in Saskatchewan is highly variable, usually highly mineralized, and in the majority of cases does not meet the drinking water quality guidelines. However, generally speaking, the deeper the ground water source is located, the less potential there is for the water quality to be impacted by surface activities.

The primary domestic ground water zone used for drinking water is the near-surface zone. Aquifers in this zone are more prone to drought and more vulnerable to contamination from surface activities, although the water is usually less mineralized than water drawn from deeper aquifers. Aquifers in this zone are used primarily for domestic supplies, because they have limited well yields. Surface water bodies, including lakes, rivers, and wetlands, can serve as either recharge or discharge areas for ground water depending on the local hydrogeology.

Aquifer protection and awareness was considered a priority by the Watershed Advisory Committee. The Committee recommended providing well owners with better information and education on aquifer issues through such initiatives as abandoned water well decommissioning workshops. The Committee also recommended that municipal wells be assessed to identify communities where threats to ground water may be significantly higher.

The Committee also examined this issue of abandoned gravel and sand pits with respect to their impact on local aquifers. The Committee recommended that watershed residents be provided with better information regarding these activities and how they impact ground water.

PLANNING OBJECTIVE

Ensure the protection of ground water supplies.

RECOMMENDATION AND KEY ACTION 55: Conduct municipal well assessments for communities within the watershed boundaries.

Responsibility	Time Frame	Priority
Saskatchewan Watershed Authority Saskatchewan Ministry of Environment Cypress Health Region Public Health Inspection	Complete in 2012	Low

Recommendation

Promote abandoned water well decommissioning programs.

KEY ACTION 56: Partner with organizations to deliver abandoned water well decommissioning programs.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc. Saskatchewan Ministry of Energy and Resources Agriculture and Agri-Food Canada – Agri-Environmental Services Branch Municipalities	Ongoing	Low

Recommendation

Promote education regarding protection of aquifers within the Swift Current Creek watershed.

KEY ACTION 57: Develop and deliver educational programs to promote ground water protection.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority	Ongoing	Low

PLANNING OBJECTIVE

Minimize the possible impacts on ground water and surface water from operational practices of sand and gravel pits on Crown and private land.

RECOMMENDATION AND KEY ACTION 58: Promote responsible operating practices to gravel pit owners and operators, as well as municipalities.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Municipalities	Ongoing	Low

Recommendation

Municipalities should develop zoning bylaws and/or guidelines to minimize impacts on ground water and surface water from gravel and sand pits on private land.

KEY ACTION 59: Develop zoning bylaws and/or guidelines for the environmentally responsible management of gravel pits within municipalities.

Responsibility	Time Frame	Priority
Municipalities Saskatchewan Ministry of Environment	Ongoing	Low

Recommendation

Develop guidelines for responsible practices for gravel and sand extraction and pit restoration on Crown and private land within Saskatchewan.

KEY ACTION 60: Review and update the Saskatchewan Ministry of Environment's Guidelines For Environmental Protection During Development and Restoration of Sand and Gravel Pits to include source water protection as an objective for gravel and sand extraction and pit restoration on Crown and private land within Saskatchewan. This document would be made available to municipalities.

Responsibility	Time Frame	Priority
Saskatchewan Ministry of Municipal Affairs Saskatchewan Ministry of Environment (on Crown land) Saskatchewan Ministry of Agriculture (on Crown land) Saskatchewan Watershed Authority	Initiate in 2010 Complete in 2012	Low

6. Implementation Strategy

A key element of any plan is its implementation. Without it, the plan is no more than a list of good intentions. Of key importance for implementing the Swift Current Creek Watershed Protection Plan is local direction. This approach promotes a strong sense of purpose and ownership with significant impetus to meet the identified goals and objectives. The Swift Current Creek Watershed Stewards will be the implementation agency for the watershed protection plan.

PLANNING OBJECTIVE

Promote and implement the Swift Current Creek Watershed Protection Plan.

KEY ACTION 61: Continue to work and meet annually with the Swift Current Creek Watershed Technical Committee.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Swift Current Creek Watershed Technical Committee	Ongoing	High

KEY ACTION 62: Explore and secure funding sources for the implementation of the Swift Current Creek Watershed Protection Plan.

Responsibility	Time Frame	Priority
Swift Current Creek Watershed Stewards Saskatchewan Watershed Authority Saskatchewan Ministry of Agriculture Municipalities Saskatchewan Ministry of Environment Fisheries and Oceans Canada Environment Canada Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc. Canadian Association of Petroleum Producers Husky Energy Penn West Energy Trust Swift Current Wildlife Federation Agriculture and Agri-Food Canada – Agri-Environmental Services Branch Trans Canada Pipeline (Keystone Pipeline)	Ongoing	High

7. Glossary

A

Abandoned water well – well that is no longer being used or maintained for future use. Abandoned wells pose a serious threat to the preservation of ground water quality and are a serious safety hazard for children and animals.

Abandoned oil/gas well – a well that has been abandoned, cut and capped at surface in a manner prescribed by the regulations or guidelines; including any measures required to ensure that the well is left in a permanently safe and secure condition.

Acre-foot – the volume of water that would cover 1 acre to a depth of 1 foot; equivalent to 43,560 cubic feet or 1,233.5 cubic meters.

Advisory committee – a diverse group of people from a community who dedicate their efforts to completion of a watershed protection plan. The committee's function is to facilitate consensus-based decision-making among stakeholders that will help resolve issues of source water protection and sound watershed management.

Anaerobic – not requiring oxygen. For example, anaerobic bacteria do not need oxygen to grow; in fact, oxygen is usually toxic to them. An anaerobic environment lacks oxygen.

Allocation – the amount of water assigned for use, out of the total amount that is available for use in a particular watershed or aquifer.

Aquatic – consisting of, relating to or being in water; living or growing in, on or near water.

Aquifer – an underground layer of porous rock, sand or other material that allows movement of water between layers of non-porous rock or clay. The formation is usually restricted to water-bearing structures capable of yielding water in sufficient quantity to constitute a usable supply.

Aquifer recharge – the process of adding water to an aquifer through the ground, occurring during rainfall, melting snow and with water from streams, rivers, wetlands and lakes.

B

Beneficial Management Practices (BMPs) – practices generally accepted for some aspect of natural resource management such as water conservation, drainage management, or erosion control and typically incorporating conservation criteria.

Best Management Practices (BMPs) – policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural. A BMP policy may affect the limits on a development.

Biodiversity (biological diversity) – the many and varied species of life forms on earth, including plants, animals, micro-organisms, the genes they possess, and their habitats.

Buffer strip – an area of land maintained in permanent vegetation that helps to control air, soil, and water quality and other environmental problems primarily on land that is used for agriculture.

C

Catchment basin – an area in which all of the underground and/or surface water runs down to the lowest point following the natural slope and collects to form a river, a lake or ground water.

Climate – meteorological elements (e.g. precipitation, temperature, radiation, wind, cloudiness) that characterize the average and extreme conditions of the atmosphere over long periods of time at a location or region of the earth's surface.

Climate change – an alteration in measured meteorological conditions that significantly differs from previous conditions and is seen to endure, bringing about corresponding changes in ecosystems and socio-economic activities.

Conservation – the preservation and renewal, when possible, of human and natural resources. The use, protection and improvement of natural resources according to principles that ensure their highest economic and social benefits.

Conservation easement – a voluntary legal agreement between a property owner and a government or qualified conservation agency. These agreements are tailored to each individual landowner and conserve the property's natural values and features by restricting the type and amount of development that can occur on the owner's property.

Cubic decametre (dam^3) – a volume unit of measure of 1,000 cubic metres or 10 metres by 10 metres by 10 metres, commonly used for water. The cubic decametre is 0.810713 (or 81%) of an acre-foot.

Canadian Water Quality Index – a tool to provide consistent procedures for Canadian jurisdictions to report water quality information to both management and the public.

D

Denitrification – the reduction of nitrates to nitrites, nitrogen monoxide (nitric oxide), dinitrogen oxide (nitrous oxide) and ultimately dinitrogen, catalyzed by microorganisms, e.g. facultative aerobic soil bacteria under anaerobic conditions.

Development – building, engineering, mining or other operations that alter or intensify the use of a resource.

Discharge – the flow of surface water in a stream or ditch or the flow of ground water from a spring or flowing artesian well; the rate of flow.

Diversion – the removal of water from any waterbody, watercourse or aquifer (either for use or storage), including the removal of water for drainage purposes. Construction of any works required for the diversion of water need approval pursuant to Section 50 of The Saskatchewan Watershed Authority Act, 2005. The total diversion is equal to the allocation plus any losses from evaporation or seepage.

Diversity – the measure of the number of species and their relative abundance.

Domestic – use for residential purposes, including household use, personal hygiene, drinking, washing clothes and dishes, flushing toilets, watering of domestic animals and outside uses such as swimming pools, car washing and lawn, garden, tree and shrub maintenance.

Drainage – movement of water off land, either naturally or man-made.

Drought – generally in reference to periods of less than average or normal precipitation over a set time, sufficiently prolonged to cause serious hydrological imbalance that results in biological or economic losses.

Ducks Unlimited Canada – a non-profit corporation that conserves, restores and manages wetlands and associated habitat for North American waterfowl. These habitats also benefit other wildlife and people.

E

Ecological – pertains to the relationship between living organisms and their environments.

Ecological diversity – the variety of biological communities or ecosystems, including various organisms and their differing, critical environments, in a given area.

Economic development – the process of using and converting resources into wealth, jobs and an enhanced quality of life.

Ecosystem – a dynamic complex of organisms (biota), including humans, and their physical environment, that interacts as a functional unit in nature.

Effluent – the treated wastewater discharged into the environment.

F

Facultative – bacteria that can live in a range of external conditions, including both aerobic and anaerobic conditions.

Fecal coliform bacteria – bacteria found in the intestinal tracts of mammals. Their presence in water or sludge is an indicator of pollution and possible contamination by pathogens.

First Nation – an Indian band or an Indian community functioning as a band but not having official band status, not including Inuit or Métis peoples.

G

Ground water – water beneath the surface of the earth in the pores and fractures of sand, gravel and rock formations.

H

Habitat – natural surroundings or native environment where a plant or animal grows and lives.

Hectare – an area of land equivalent to 2.471 acres, considered an area slightly less than three Canadian football fields.

Herbicide – substance used to kill unwanted plants that compete with a crop for sunlight, nutrients and water.

Hydrology – the science of the waters of the earth, their occurrences, circulation and distribution on or below the earth's surface.

Hydrometric – pertaining to the measurement of hydrological parameters.

Hydrometric station – a location where systematic records of stage (water level) or stage and discharge (flow) are obtained.

I

Inactive oil/gas well – a well that is not used for at least 12 consecutive months. Unmanaged or improperly managed wells pose a serious threat to the preservation of ground water quality and a serious safety hazard for people and animals. All inactive wells should either be rendered safe and secure or abandoned.

Infrastructure – basic facilities, services and installations needed for a community or society to function, such as transportation, communication, health, power, water and wastewater treatment systems.

Invasive plant – a plant that establishes easily and spreads aggressively into new areas and environments, often with detrimental effects on native plant species.

L

Land cover – predominant vegetation on the surface of a parcel of land.

Land use – present use of a given area of land.

M

Mitigation – reduction or elimination of negative impacts from a specific activity.

N

Nitrate – the univalent radical NO3 or a compound containing it, as a salt or an ester of nitric acid.

Non-point source pollution – single or multiple contaminants of unknown origin that enter waterways, degrading water quality.

Noxious weed – a plant species that has been designated by provincial or federal agricultural authorities as a plant that is injurious to agricultural and/or horticultural crops and/or humans and livestock.

P

Partnership – co-operative, collaborative alliance between/among stakeholders in a non-legal arrangement used to improve and build relationships and achieve common goals.

Pathogen – An agent that causes disease, especially a living microorganism such as a bacterium or fungus.

Pesticide – chemical agents such as herbicides, insecticides, fungicides, nematocides and rodenticides used to control specific organisms or kill unwanted pests.

Permeability – the ability of a material to allow the passage of a liquid, such as water through rocks. Permeable materials, such as gravel and sand, allow water to move quickly through them, whereas impermeable material, such as clay, does not allow water to flow freely.

Point source contamination – a static and easily identifiable source of air, soil or water pollution.

Policy – a course or principle of action adopted or proposed.

Pollution – alternation of the character or quality of the environment that renders it unfit or less suited for use. Water pollution alters the physical, chemical or biological properties through introduction of substance(s) that adversely affect beneficial uses for water.

Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc. – a non-profit agriculture organization that focuses on timely, effective delivery of agriculture programs to Saskatchewan producers. PCAB is committed to working with both government and industry to ensure a cooperative, efficient approach to agricultural program delivery.

R

Recharge – replenishment of ground water by the addition of water.

Restoration – the act of restoring something to a satisfactory state.

Riparian – an area of land adjacent to, or connected with, a stream, river, lake or wetland that contains vegetation that is distinctly different from vegetation of adjacent upland areas.

Riparian areas – the zone of vegetation alongside waterways and other surface water. Lush and diverse vegetation is the best sign of healthy, well-managed riparian areas and is critical to filtering water and slowing runoff.

Rural municipality – a defined territory incorporated under The Municipalities Act. A rural municipality is created by a Ministerial Order that describes the municipal boundaries and divisions therein. A rural municipality is governed by an elected council that can hire staff to manage daily administration and maintain municipal services (e.g. roads, utilities, recreation facilities).

S

Saskatchewan Association of Rural Municipalities – an independent association that represents rural municipal governments in Saskatchewan.

Sewage – the waste and wastewater from residential or commercial establishments that are normally discharged into sewers.

Sewage lagoon – a shallow pond where sunlight, bacterial action and oxygen work to purify wastewater; also used for storage of wastewater.

Shoreland – Crown land that lies inland, within 30 metres of a bank or high water mark and between the boundaries of a surveyed subdivision and high-water mark of a water body.

Source waters – untreated water from streams, rivers, lakes or underground aquifers used to supply private wells and public drinking water.

Source water protection – the prevention of pollution and the sound management of factors and activities that (may) threaten water quality and quantity of lakes, reservoirs, rivers, streams and ground water.

Stakeholder – an individual or group with direct or indirect interest in issues or situations, usually involved in understanding and helping resolve or improve their situations.

Stewardship – judicious care and responsibility by individuals or institutions for reducing their impacts on the natural environment.

Sustainability – the ability of an ecosystem to maintain ecological processes and functions, biological diversity and productivity over time.

Sustainable – the ability to manage and sustain a resource over time or the capability of being continued with minimal long-term effect on the environment.

Saskatchewan Urban Municipalities Association –, an independent association working to improve urban life for Saskatchewan people.

Saskatchewan Wildlife Federation – a non-profit, non-government charitable organization comprising more than 25,000 Saskatchewan sportsmen and conservationists.

Saskatchewan Water Quality Index – a composite measure of the chemical and organic makeup of the water in a particular drainage basin. Depending on the specified use (e.g., recreation, irrigation, livestock watering, protection of aquatic life, etc.) of the water in that basin, its quality is rated from "poor" to "excellent."

W

Water quality – the chemical, physical and biological characteristics of water with respect to its suitability for a specific use.

Watershed – an elevated boundary contained by its drainage divide and subject to surface and subsurface drainage under gravity to the ocean or interior lakes.

Watershed health – the desired maintenance over time of biological diversity, biotic integrity and ecological processes of a watershed.

Watershed and aquifer management – a process, within the geographic confines of a watershed or aquifer, that facilitates planning, directing, monitoring and evaluating activities to ensure sustainable, reliable, safe and clean water supplies.

Watershed and aquifer planning – a process, within the geographic confines of a watershed or aquifer and with the participation of stakeholders, to develop plans to manage and protect water resources.

Watershed protection – the treatment of watershed lands to control soil, water and wind erosion and ensure sound management and protection of source waters.

Water quality – the chemical, physical and biological characteristics of water with respect to its suitability for a specific use.

Wetland – an area of low-lying land covered by water, often enough to support aquatic plants and wildlife for part of the life cycle. The wetland area includes the wet basin and adjacent upland.

8. Appendices

Swift Current Creek Watershed Advisory Committee

Peter Allen	Town of Shaunavon
Bix Biederbeck	Swift Current Creek Watershed Stewards Inc.
Pat Billard	Town of Shaunavon
Curt Chickoski	R.M. of Saskatchewan Landing #167
Darren Fiddler	R.M. of Webb #136
Trevor Fiecht	City of Swift Current
Mac Forster	City of Swift Current
Frank Glenn	R.M. of Swift Current #137
Sonia Glubish	Husky Energy
Al Hildebrand	Town of Herbert
Al Kildaw	Town of Herbert
Tom Knapik	Penn West Energy Trust
Bernie Lemire	R.M. of Carmichael #109
Don Lundberg	R.M. of Arlington #79
Harold Martens	R.M. of Excelsior #166 / Swift Current Creek Watershed Stewards Inc.
Reg Parsons	R.M. of Excelsior #166
Greg Paul	R.M. of Lac Pelletier #107
Tom Pye	Husky Energy
Doreen Schroeder	Town of Herbert
Doug Smith	Swift Current Wildlife Federation
Howard Steinley	Rush Lake Water Users Association
Alicia Tait	Odyssey Environmental
Arlene Unvoas	Swift Current Creek Watershed Stewards Inc.
Joan Williamson	Lac Pelletier Cabin Owners Group
Corey Zadko	Penn West Energy Trust

Swift Current Creek Watershed Technical Committee

Bix Biederbeck	Swift Current Creek Watershed Stewards Inc.
Sheldon Clarke	Saskatchewan Ministry of Municipal Affairs
Krista Connick	Saskatchewan Watershed Authority
Ron Dolter	Saskatchewan Ministry of Energy and Resources
Janna Foster-Willfong	Saskatchewan Watershed Authority
Brad Giesbrecht	Cypress Health Region
Gord Hagen	Saskatchewan Watershed Authority
Robin Hilts	Saskatchewan Ministry of Environment
Trevor Lennox	Saskatchewan Ministry of Agriculture
Kei Lo	Saskatchewan Watershed Authority
Ashley Lundgren	Saskatchewan Watershed Authority
Morag Lyon	Cypress Health Region
Harold Martens	Swift Current Creek Watershed Stewards Inc.
Bart Oegema	Saskatchewan Watershed Authority
Korvin Olfert	Saskatchewan Ministry of Agriculture
Dan Runcie	Agriculture and Agri-Food Canada – Agri-Environmental Services Branch
Robin Tod	Saskatchewan Watershed Authority
Jackie Treen	Cypress Health Region
Muhammad Tubbsum	Saskatchewan Watershed Authority
Arlene Unvoas	Swift Current Creek Watershed Stewards Inc.
Kevin Wingert	Saskatchewan Watershed Authority

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